temperature of 80 to 200℃ for one minute (step "b"). Finally, the substrate is heated at a temperature of 400 to 450℃ for 30 minutes (step "c"), and a polymethyl siloxane film is obtained.

In the above sequence (steps "a" to "c"), the step "b" is responsible for a treatment for solidifying a film material by solvent evaporation, and the step "c" is responsible for a treatment for forming a bridge between polymethyl siloxane molecules, respectively.

The characteristics of the polymethyl siloxane film formed by the process are described below.

In general, although such the insulation film is low in relative dielectric constant, the density is low, and/or a void concentration is high. Thus, the polymethyl siloxane film has a defect that its mechanical strength is low.

Further, when such an insulation film with low mechanical strength is formed by the above described process, there arises a problem that a crack at predetermined thickness or more occurs. The thickness of a limit that a crack does not occur is referred to as crack resistance film thickness.

Here, the characteristics of the interlayer insulation film of a semiconductor device is better when a relative dielectric constant is lower, and the crack resistance film thickness is larger. The above described polymethyl siloxane film formed by the

conventional process is 1200 nm in crack resistance film thickness when the relative dielectric constant is 2.8. Therefore, the polymethyl siloxane film formed by the conventional process has not been sufficient as characteristics of the interlayer insulation film of the semiconductor device.

Here, factors for producing the crack in the polymethyl siloxane film with the low relative dielectric constant formed by the conventional process will be described below. Such factors for producing the crack are that an internal stress caused by film contraction during bridge reaction occurs in the film with the low mechanical strength, and a thermal stress is applied during film formation.

In the case of the polymethyl siloxane film, the bridge reaction occurs due to dehydrate condensation. During the bridge reaction, a film contraction occurs, and after the formation of the film, the film contraction results in a residual stress of the film. In addition, during the bridge reaction due to heat treatment, the film contraction occurs while a material is thermally expanded. Thus, when this film is cooled to room temperature, contraction due to the temperature fall is applied. As a result, the residual stress of the film is further increased. In addition, a thermal stress applied by the temperature rise and fall causes an increase of bridge defects or voids, whereby the

mechanical strength of the film that is originally weak is further weakened.

Further, recently, as a method for curing a coat film, for example, as disclosed in Jpn. Pat. Appln. KOKAI Publication No. 10-303190, there is proposed a method for coating a resin, partially evaporating a solvent, irradiating the coat film with high energy rays at room temperature or the like to cure the coat film, and further, applying a high temperature heat treatment to the coat film. According to the above described method, an insulation film with its excellent coat properties and flatness is obtained.

However, in order to form silica (silicon oxide film) with excellent coverage properties and flatness by the above described method, a resin is irradiated with high energy rays of 165 keV. Although the coat film can be cured by irradiation of such high energy rays at high levels, a network with its structure of a precursor in the coat film cannot be deformed. That is, with the above described method, the permittivity of the coat film cannot be reduced, and desired mechanical strength cannot be provided to the coat film. Further, the above publication fails to describe and suggest the reduction of permittivity of the coat film.

Further, in the method for forming the coat film using only one of heat treatment and electronic